REMARKS

Claims 1-11 are pending in the present application. By this Amendment, claims 1, 10 and 11 have been amended. No new matter has been added. It is respectfully submitted that this Amendment is fully responsive to the Office Action dated February 17, 2006.

Claim Rejections - 35 U.S.C. §103

Claims 1-4, 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (3,742,382) in view of Zorabedian (6,282,215).

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (3,742,382) in view of Zorabedian (6,282,215), and further in view of Lewis (5,146,185).

Claim 7 is rejected under U.S.C. 103(a) as being unpatentable over Smith (3,742,382) in view of Zorabedian (6,282,215), and further in view of Zhu (6,201,821).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (3,742,382) in view of Zorabedian (6,282,215), and further in view of Sobey (5,457,707).

Each of these rejections is respectfully traversed.

Response
Application No. 10/811,142
Attorney Docket No. 042132

Independent Claim 1:

Independent claim 1 calls for *a computing means for obtaining the intensity of probe beam detected by said photo detector, a demodulated signal of the probe beam, a difference in intensity of probe beam between a case in which the pumping beam is ON and OFF, and a difference in demodulated signal, and*

a feedback means for feeding back information concerning the difference in the demodulated signal obtained by said computing means, to said laser frequency adjusting means which thereby stabilizes the frequency of said ECDL based on said information.

With regard to claim 1, the Examiner asserts in pages 2 and 3 of the Action that Smith discloses:

> a computing means (#27) for obtaining the intensity of the probe beam detected by the photo detector, a demodulated signal of the probe beam, a difference in intensity of the probe beam between a case in which the pumping beam is ON and OFF, and a difference in demodulated signal, and a feedback means (#28) for feeding back information concerning the difference in the demodulated signal obtained by said computing means, to said laser frequency adjusting means which thereby stabilizes the frequency of the laser based on the information.

However, it is respectfully submitted that the Examiner is mis-characterizing the teachings of Smith, since the phase sensitive detector 27 of Smith fails to constitute *a computing means for obtaining the intensity of probe beam detected by said photo detector, a demodulated signal of the probe beam, a difference in intensity of probe beam between a case in which the pumping beam is ON and OFF, and a difference in demodulated signal.*

Instead, the phase sensitive detector 27 of Smith merely determines a phase difference between the desired reference signal, output from the photodetector 34, and the detected remainder of the first component of the laser beam, output from the detector 21. In other words, clearly the phase sensitive detector 27 fails to obtain any type of demodulated signal of the probe beam.

Further, since the phase sensitive detector 27 of Smith fails to determine any type of demodulated signal, it is respectfully submitted that Smith also fails to disclose or fairly suggest the features of claim 1 concerning *a feedback means for feeding back information concerning the difference in the demodulated signal obtained by said computing means, to said laser frequency adjusting means which thereby stabilizes the frequency of said ECDL based on said information.*

Moreover, it is respectfully submitted that the secondary reference of Zorabedian fails to disclose or fairly suggest the above-noted drawbacks and deficiencies of Smith with regard to the features of claim 1 concerning *a computing means for obtaining the intensity of probe beam detected by said photo detector, a demodulated signal of the probe beam, a difference in intensity of probe beam between a case in which the pumping beam is ON and OFF, and a difference in demodulated signal; and a feedback means for feeding back information concerning the*

difference in the demodulated signal obtained by said computing means, to said laser frequency adjusting means which thereby stabilizes the frequency of said ECDL based on said information.

In addition, claim 1, as amended, now includes the features of claim 10 regarding *a first optical setup for introducing the probe beam into a flat surface of said cell, and a second optical setup for introducing the pumping beam into a side surface of said cell.*

However, with regard to these previous features of claim 10, now included in claim 1, the Examiner asserts at lines 18 to 22 of page 7 of the Office Action that Sobey discloses:

> an optical setup for introducing a probe beam (seed beam) into a flat surface of a cell (Fig. 1, #11, "seed beam") as well as a second setup for introducing a pumping beam into a side surface of a cell (Fig. 1, #18) wherein the second setup has optical means for increasing the beam diameter of the pumping beam (prism beam expander, Fig. 4 #82).

However, the Examiner has misunderstood the teaching of Sobey, since the power OPO 12 in Figure 1 is not a gas cell but an apparatus as shown in figure 3. As shown in Figure 3, power OPO comprises the beam turning optics 57, an angle tunable mount 35 which comprises a gain media 36 consisting of a photonic crystal BBO, β -barium borate, and mirrors 50, 54, 55 and 51 (see at lines 20-26 of column 3, Figs 2, 3, and the abstract of the Sobey).

As shown in Figure 3, the beam turning optics 57 changes the direction of the seed beam 40 and the beam 40 enters the BBO CRYSTAL 39, which is arranged to have some angle with

the direction of the beam 40. On the other hand, the mirror 54 changes the direction of the pump beam 56 and the pump beam 56 enters the BBO crystal in a parallel direction of the seed beam 40 (see Attached Memo of Figures 1 and 3 of the Sobey).

Namely, the seed beam 40 and the pump beam 56 enter from the same side of a gain media 36, and the power OPO 12 and a gain media 36 are not a cell into which gas is charged. Thus, it is submitted that Sobey is not relevant to the present invention and fails to disclose or fairly suggest the features of claim 1, as amended, concerning *a first optical setup for introducing the probe beam into a flat surface of said cell, and a second optical setup for introducing the pumping beam into a side surface of said cell.* Further, it is submitted that the other cited references also fail to disclose the constituent elements of the present invention.

Independent Claim 11:

Independent claim 11 calls for *a first demodulated signal obtaining process which modulates the frequency of the laser beam by laser frequency adjusting means for lock-in detection to obtain a demodulated signal of the probe beam, a second demodulated signal obtaining process in which lock-in detection which is in synchronization with said constant time intervals is carried out to obtain a demodulated signal of the probe beam, and a feedback process for feeding back, to the laser frequency adjusting means, an error signal obtained from*

the demodulated signal of the probe mean obtained in the second demodulated signal obtained process.

With regard to claim 11, the Examiner asserts in page 5 of the Action that Smith discloses:

> a first demodulated signal obtaining process (Fig. 1, #27) which modulates the frequency of the laser beam by laser frequency adjusting means (#18) for lock-in detection to obtain a demodulated signal of the probe beam,
> a second demodulated signal obtaining process (Fig. 2) in which lock-in detection which is in synchronization with said constant time interval is carried out to obtain a demodulated signal of the probe beam, and a feedback process (#28) for feeding back, to the laser frequency adjusting means, an error signal obtained from the demodulated signal of the probe beam obtained in the second demodulated signal obtaining process.

However, as discussed above, the phase sensitive detector 27 of Smith simply fails to obtain any type of demodulated signal and instead merely determines a phase difference between the desired reference signal, output from the photodetector 34, and the detected remainder of the first component of the laser beam, output from the detector 21.

Therefore, it is respectfully submitted that Smith fails to disclose or fairly suggest the features of claim 11 concerning *a first demodulated signal obtaining process which modulates the frequency of the laser beam by laser frequency adjusting means for lock-in detection to obtain a demodulated signal of the probe beam, a second demodulated signal obtaining process*

in which lock-in detection which is in synchronization with said constant time intervals is carried out to obtain a demodulated signal of the probe beam, and a feedback process for feeding back, to the laser frequency adjusting means, an error signal obtained from the demodulated signal of the probe mean obtained in the second demodulated signal obtained process.

Moreover, it is respectfully submitted that the secondary reference of Zorabedian fails to disclose or fairly suggest the above-noted drawbacks and deficiencies of Smith with regard to the features of claim 11 concerning *a first demodulated signal obtaining process which modulates the frequency of the laser beam by laser frequency adjusting means for lock-in detection to obtain a demodulated signal of the probe beam, a second demodulated signal obtaining process in which lock-in detection which is in synchronization with said constant time intervals is carried out to obtain a demodulated signal of the probe beam, and a feedback process for feeding back, to the laser frequency adjusting means, an error signal obtained from the demodulated signal of the probe mean obtained in the second demodulated signal obtained process.*

Further, as discussed above with regard to claim 1, Sobey is not relevant to the present invention and fails to disclose or fairly suggest the features of claim 1, as amended, concerning *a first optical setup process for introducing the probe beam into a flat surface of said cell, and a second optical setup process for introducing the pumping beam into a side surface of said cell.*

In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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Attachment: Memo of Figures 1 and 3 of the Sobey

Memo

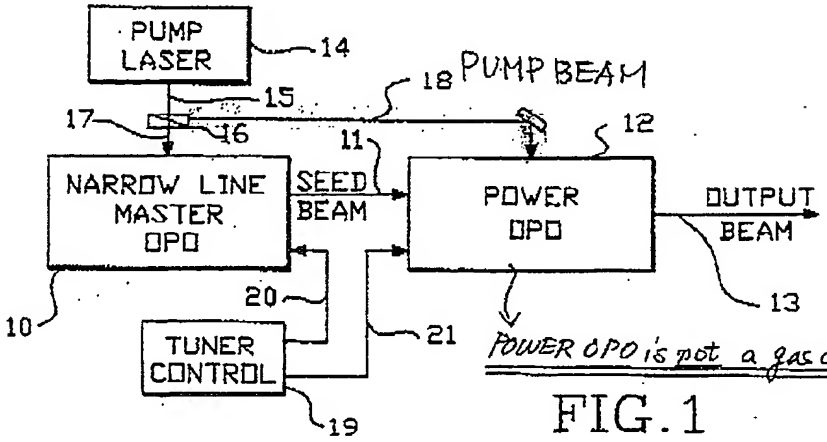

FIG. 1

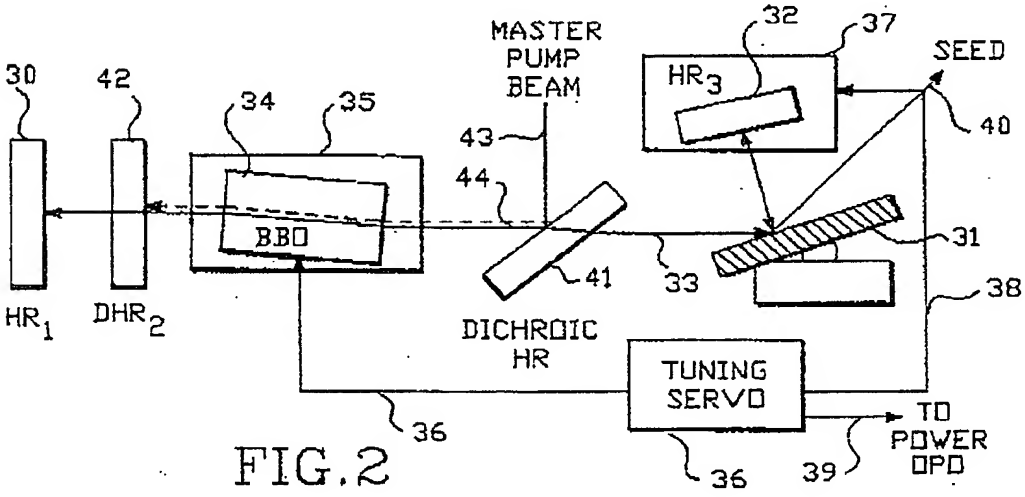

FIG. 2

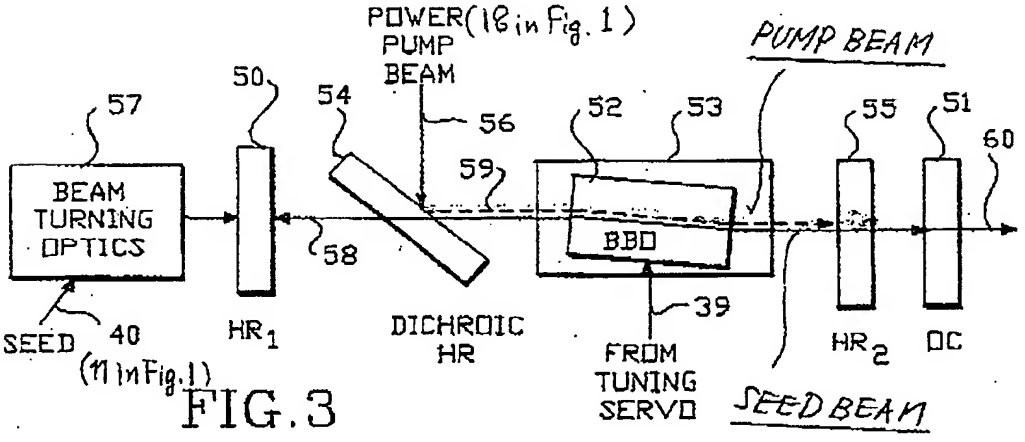

FIG. 3